CLAIMS

1. A method of protecting an x-ray analyzer comprising:

applying a high voltage to a x-ray tube;

obtaining discharge phenomenon that occurs in an x-ray generating system as a pulse array;

counting a pulse number of the pulse array; and

terminating the high voltage output to the x-ray tube when the pulse number reaches a predetermined value.

2. An electric discharge detection circuit comprising:

an X-ray tube;

a power supply to generate a high voltage applied to the x-ray tube;

an x-ray tube voltage detector to detect the high voltage applied to the x-ray tube;

a differentiation circuit to differentiate a signal output from the x-ray tube voltage detector;

a zero-crossing comparator to discriminate a polarity of an output signal from the differentiation circuit;

a re-triggerable one-shot pulse generating circuit that generates a one-shot pulse at a fixed period, a pulse output from the zero-crossing comparator being a trigger of the one-shot pulse generating circuit;

a counter, having a one-shot pulse output from the one-shot pulse generating circuit input as a operation enable signal, to count pulses output from the zero-crossing comparator during a period when operation is enabled;

an x-ray cut-off circuit to transmit a command signal to the power supply to stop generation of high voltage when receiving a carry output from the counter; and

a display to display occurrence of an electric discharge phenomenon upon receipt of the carry output from the counter.

3. An electric discharge detection circuit comprising:

an X-ray tube;

a power supply to generate a high voltage applied to the x-ray tube;

an x-ray tube voltage detector to detect the high voltage applied to the x-ray tube;

a discrimination circuit to discriminate between substantial changes in a signal output from the x-ray tube voltage detector within a predetermined time period;

an x-ray cut-off circuit to terminate generation of the high voltage by the power supply when the number of substantial changes in the signal output from the x-ray tube voltage detector within the predetermined time period exceeds a preset amount; and

a display to display the preset amount has been exceeded.